

**What Is Claimed Is:**

1           1.       A method for facilitating validation of data retrieved from a  
2 secondary storage device, comprising:  
3           receiving a write request to write new data to a block of the secondary  
4 storage device;  
5           calculating a new checksum value from the new data;  
6           retrieving a current checksum value and an old checksum value associated  
7 with the block of the secondary storage device;  
8           performing a checksum write operation to a validation device to update the  
9 current checksum value and the old checksum value; and  
10          performing a data write operation to the secondary storage device to write  
11 the new data to the block of the secondary storage device.

1           2.       The method of claim 1, wherein if the current checksum value is  
2 invalid, which indicates that the current checksum value has not been written to,  
3 and the old checksum value is similarly invalid, performing the checksum write  
4 operation involves updating the current checksum value to be the new checksum  
5 value.

1           3.       The method of claim 1, wherein if the current checksum value is  
2 valid and the old checksum value is invalid, performing the checksum write  
3 operation involves updating the old checksum value to be the current checksum  
4 value, and updating the current checksum value to be the new checksum value.

1           4.       The method of claim 1, wherein if the current checksum value is  
2 valid and the old checksum value is valid, performing the checksum write

3 operation involves updating the old checksum value to match data that is presently  
4 stored in the block on the secondary storage device, and updating the current  
5 checksum value to be the new checksum value.

1 5. The method of claim 4, wherein updating the old checksum value  
2 to match data that is presently stored in the block involves:  
3 determining whether the current checksum value or the old checksum  
4 value matches data that is presently stored in the block on the secondary storage  
5 device; and  
6 using the matching value to update the old checksum value.

1 6. The method of claim 1, further comprising:  
2 receiving a read request to read a second block of data from the secondary  
3 storage device;  
4 performing a data read operation to read the second block of data from the  
5 secondary storage device;  
6 calculating a checksum value from the second block of data;  
7 performing a checksum read operation to read an existing checksum value  
8 for the second block of data from the validation device;  
9 comparing the calculated checksum value with the existing checksum  
10 value; and  
11 indicating an error condition if the calculated checksum value does not  
12 match the existing checksum value.

1 7. The method of claim 1, wherein the secondary storage device is a  
2 disk drive.

1           8.       The method of claim 1, wherein the validation device is separate  
2       from the secondary storage device.

1           9.       The method of claim 1, wherein the validation device and the  
2       secondary storage device are the same device.

1           10.      A method for facilitating validation of data retrieved from a disk,  
2       comprising:  
3           receiving a write request to write new data to a block of the disk;  
4           calculating a new checksum value from the new data;  
5           retrieving a current checksum value and an old checksum value associated  
6       with the block of the disk;  
7           performing a checksum write operation to a validation device to update the  
8       current checksum value and the old checksum value;  
9           wherein if the current checksum value is invalid, which indicates that the  
10       current checksum value has not been written to, and the old checksum value is  
11       similarly invalid, performing the checksum write operation involves updating the  
12       current checksum value to be the new checksum value;  
13          wherein if the current checksum value is valid and the old checksum value  
14       is invalid, performing the checksum write operation involves updating the old  
15       checksum value to be the current checksum value, and updating the current  
16       checksum value to be the new checksum value;  
17          wherein if the current checksum value is valid and the old checksum value  
18       is valid, performing the checksum write operation involves updating the old  
19       checksum value to match data that is presently stored in the block on the disk, and  
20       updating the current checksum value to be the new checksum value; and

21 performing a data write operation to the disk to write the new data to the  
22 block of the disk.

1 11. A computer-readable storage medium storing instructions that  
2 when executed by a computer cause the computer to perform a method for  
3 facilitating validation of data retrieved from a secondary storage device, the  
4 method comprising:  
5 receiving a write request to write new data to a block of the secondary  
6 storage device;  
7 calculating a new checksum value from the new data;  
8 retrieving a current checksum value and an old checksum value associated  
9 with the block of the secondary storage device;  
10 performing a checksum write operation to a validation device to update the  
11 current checksum value and the old checksum value; and  
12 performing a data write operation to the secondary storage device to write  
13 the new data to the block of the secondary storage device.

1 12. The computer-readable storage medium of claim 11, wherein if the  
2 current checksum value is invalid, which indicates that the current checksum  
3 value has not been written to, and the old checksum value is similarly invalid,  
4 performing the checksum write operation involves updating the current checksum  
5 value to be the new checksum value.

1 13. The computer-readable storage medium of claim 11, wherein if the  
2 current checksum value is valid and the old checksum value is invalid, performing  
3 the checksum write operation involves updating the old checksum value to be the

4 current checksum value and updating the current checksum value to be the new  
5 checksum value.

1 14. The computer-readable storage medium of claim 11, wherein if the  
2 current checksum value is valid and the old checksum value is valid, performing  
3 the checksum write operation involves updating the old checksum value to match  
4 data that is presently stored in the block on the secondary storage device, and  
5 updating the current checksum value to be the new checksum value.

1 15. The computer-readable storage medium of claim 14, wherein  
2 updating the old checksum value to match data that is presently stored in the block  
3 involves:  
4 determining whether the current checksum value or the old checksum  
5 value matches data that is presently stored in the block on the secondary storage  
6 device; and  
7 using the matching value to update the old checksum value.

1 16. The computer-readable storage medium of claim 11, wherein the  
2 method further comprises:  
3 receiving a read request to read a second block of data from the secondary  
4 storage device;  
5 performing a data read operation to read the second block of data from the  
6 secondary storage device;  
7 calculating a checksum value from the second block of data;  
8 performing a checksum read operation to read an existing checksum value  
9 for the second block of data from the validation device;

1 comparing the calculated checksum value with the existing checksum  
2 value; and  
3 indicating an error condition if the calculated checksum value does not  
4 match the existing checksum value.

1 17. The computer-readable storage medium of claim 11, wherein the  
2 secondary storage device is a disk drive.

1 18. The computer-readable storage medium of claim 11, wherein the  
2 validation device is separate from the secondary storage device.

1 19. The computer-readable storage medium of claim 11, wherein the  
2 validation device and the secondary storage device are the same device.

1 20. An apparatus that facilitates validation of data retrieved from a  
2 secondary storage device, comprising:  
3 a receiving mechanism that is configured to receive a write request to  
4 write new data to a block of the secondary storage device;  
5 a checksum mechanism that is configured to calculate a new checksum  
6 value from the new data;  
7 a retrieving mechanism that is configured to retrieve a current checksum  
8 value and an old checksum value associated with the block of the secondary  
9 storage device;  
10 a checksum writing mechanism that is configured to perform a checksum  
11 write operation to a validation device to update the current checksum value and  
12 the old checksum value; and

13 a data writing mechanism that is configured to perform a data write  
14 operation to the secondary storage device to write the new data to the block of the  
15 secondary storage device.

1 21. The apparatus of claim 20, wherein if the current checksum value  
2 is invalid, which indicates that the current checksum value has not been written to,  
3 and the old checksum value is similarly invalid, the checksum writing mechanism  
4 is configured to update the current checksum value to be the new checksum value.

1 22. The apparatus of claim 20, wherein if the current checksum value  
2 is valid and the old checksum value is invalid, the checksum writing mechanism  
3 is configured to update the old checksum value to be the current checksum value  
4 and to update the current checksum value to be the new checksum value.

1 23. The apparatus of claim 20, wherein if the current checksum value  
2 is valid and the old checksum value is valid, the checksum writing mechanism is  
3 configured to update the old checksum value to match data that is presently stored  
4 in the block on the secondary storage device, and to update the current checksum  
5 value to be the new checksum value.

1 24. The apparatus of claim 23, wherein while updating the old  
2 checksum value to match data that is presently stored in the block, the checksum  
3 writing mechanism is configured to:  
4 determine whether the current checksum value or the old checksum value  
5 matches data that is presently stored in the block on the secondary storage device;  
6 and to  
7 use the matching value to update the old checksum value.

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1           25.    The apparatus of claim 20,  
2            wherein the receiving mechanism is configured to receive a read request to  
3   read a second block of data from the secondary storage device;  
4            a data reading mechanism that is configured to perform a data read  
5   operation to read the second block of data from the secondary storage device;  
6            wherein the checksum mechanism is configured to calculate a checksum  
7   value from the second block of data;  
8            a checksum reading mechanism that is configured to perform a checksum  
9   read operation to read an existing checksum value for the second block of data  
10   from the validation device; and  
11          a validation mechanism that is configured to,  
12                  compare the calculated checksum value with the existing  
13                  checksum value, and to  
14                  indicate an error condition if the calculated checksum value  
15                  does not match the existing checksum value.

1           26.    The apparatus of claim 20, wherein the secondary storage device is  
2   a disk drive.

1           27.    The apparatus of claim 20, wherein the validation device is  
2   separate from the secondary storage device.

1           28.    The apparatus of claim 20, wherein the validation device and the  
2   secondary storage device are the same device.